

# Reflective Arrayed Waveguide Grating

## Abstract

This invention discloses a "reflective arrayed waveguide grating," (RAWG) for demultiplexing a multiplexed optical signal into its component wavelengths and for multiplexing  $n$  optical signals into a multiplexed signal. The present invention found that a single slab can be used for coupling the signal in and for focusing the signal out of the array of waveguide that functions as a grating; and a single external fiber array interface containing plurality of fibers can be used for both inputting the signal in and for outputting the signal from the RAWG. Advantageously, this method reduces the chip size and on-chip insertion loss by eliminating a slab and using 50% shorter waveguides in the array allowing significant savings of the silicon real estate. The smaller chip size increases the reliability of the device significantly and almost doubles the yield of chips per wafer. Additionally, used as a building block, these chips can enable further functionality enhancement via tiers of monolithic triple-phase integration.